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Funding a New Bridge in Rural Vietnam: A Field Experiment on Conditional Cooperation and Default Contributions

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Abstract

The ability to provide public goods is essential for economic and social development, yet there is very limited empirical evidence regarding contributions to a real local public good in developing countries. This paper analyzes a field experiment where 200 households in rural Vietnam could make real contributions to an archetypical public good, a bridge. In particular, we study the role of two kinds of social influence: *i*) conditional cooperation, i.e., that people may be more willing to cooperate if others do, and *ii*) the effects of the default alternative, i.e., that people are influenced by the default alternative presented to them in the choice situation. We find significant and substantial effects of both kinds of influence. For example, by either giving the subjects the additional information that one of the most common contributions by others is 100,000 dong (a relatively low contribution) or introducing a zero-contribution default alternative, the average contribution decreases by about 20% compared to the baseline case.

JEL-classification: C93; Q50

Key words: voluntary contribution; local public goods; social influence; default contribution, conditional cooperation; field experiment.

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1. Introduction

The ability to handle social dilemma-type situations, such as providing an adequate amount of public goods, and the corresponding free-rider problems, is crucial for economic and social development (Hall and Jones, 1999; La Porta et al., 1999; Ostrom, 2009). In the present paper, we analyze experimentally the role of social influence, in terms of modified information about others' contribution and provision of default alternatives, for real contributions to an archetypical public good, a bridge (cf. Dupuit, 1844), in rural Vietnam. The field experiment was designed as a threshold public good experiment where the subjects, consisting of the household heads of all households in the village, were asked to make voluntary contributions for the construction of a bridge in their village. If the village members contributed a sufficient amount of money (which they did), the bridge would be built.

Most poor countries have weak or badly functioning governments, meaning that a large share of public goods have to be provided privately with the help of local institutions and mechanisms. Elinor Ostrom and co-authors have carefully analyzed the effects of different institutional settings for the abilities of local societies, in particular in developing countries, to effectively handle social dilemma-type situations; see, e.g., Dietz et al. (2003), Ostrom (1990, 2009), and Ostrom et al. (1992). Yet, little has been done in this area regarding the direct effects of social influence on individuals' behavior. Such effects have instead been carefully analyzed in the rapidly growing literature on charitable giving (see, e.g., List and Lucking-Riley, 2002; Landry et al., 2006; Andreoni and Bernheim, 2009; Shang and Croson, 2009; Alpizar and Martinsson, 2010; Soetevent, 2011). However, the extent to which these insights are transferable to the issue of contribution to real public goods in a developing country context is far from obvious. First, the charitable giving literature has primarily focused on relatively rich people's contribution, implying for example that the contributions have typically been small relative to the subjects' income. Second, the subjects' direct benefit of the good provided by the charity has typically been negligible, except for the warm glow effects of contributing to a good cause (cf. Andreoni, 1989, 1990).

In the present paper, we focus on two types of social influence: *i*) conditional cooperation, i.e., that people may be more willing to cooperate if others cooperate (see, e.g., Gächter, 2007), and *ii*) the effects of a default alternative, i.e., that people are often found to be influenced by a default alternative presented to them in the choice situation (see, e.g., Thaler and Sunstein, 2008). To find out whether and to what extent these kinds of social

influence matter for people's voluntary contributions to local public goods is important from a policy perspective. For example, aid organizations, NGOs, and local decision makers at the village level can modify the choice of frame for a particular policy implementation.

Many experimental results can be interpreted in terms of conditional cooperation. For example, Fischbacher et al. (2001) found, based on the strategy method, that about 50% of the subjects increase their contribution in a one-shot public good game if others do so as well. Fischbacher and Gächter (2010) concluded that conditional cooperation appears to be the main reason behind the typically observed pattern of decreasing cooperation rates in repeated public goods games. For our purpose, evidence from the field is particularly interesting. Frey and Meier (2004) analyzed the behavior of students in Zurich who had the opportunity to contribute to two social funds every semester. The contributions were higher when they were informed that many other students were contributing, although the effect was not statistically significant. In a field-experimental setting, Alpizar et al. (2008) investigated people's voluntary contribution to a natural park. When the subjects were told that the typical contribution of others was \$2 (a small contribution), the probability of a contribution increased and the conditional contribution decreased, compared with no provision of reference information. Providing a high reference level (\$10) increased the conditional contribution, whereas the probability of contribution remained unaffected. The overall effects of the reference information were quite modest. Shang and Croson (2009) investigated how information about a typical contribution to a radio station affects subject contributions and found that the highest reference amount (\$300) yielded a significantly higher contribution than no provision of any information. The direction for smaller amounts (\$75 and \$180) was the same, although not statistically significant.

There is also much empirical evidence that a default alternative matters for actual choices in many areas such as pension savings (Madrian and Shea, 2001; Choi et al., 2004; Cronqvist and Thaler, 2004), car insurance (Johnson et al., 1993), and health clubs (DellaVigna and Malmendier, 2006). With respect to pro-social behavior, Johnson and Goldstein (2003) compared countries with different organ donation rules and found that countries where people by default *are not* donors, i.e., people have to opt-in to become donors, had a significantly and substantially lower fraction of people donating compared to countries where people by default *are* donors, even though they had the same freedom of

choice in both cases.¹ Pichert and Katsikopoulou (2008) showed that “green” defaults could have significant effects on the choice of green electricity; when customers had to opt-out in order to buy non-green electricity many more customers bought green electricity. On the other hand, Löfgren et al. (2010) did not find any default effects on the choice of CO₂ offsets for air transport using a sample of experienced subjects.

Yet, as far as we know, no previous studies have tried to quantify the treatment effects of information about the contributions of others or of default alternatives on voluntary contributions to a real local public good – let alone in a developing country where this is presumably more important. This is the task of the present paper, of which the remainder is organized as follows: Section 2 provides the background of the Giong Trom village in rural Vietnam and its need for a new bridge. Section 3 presents the theoretical model, Section 4 the field-experimental design, and Section 5 the corresponding results. Finally, Section 6 concludes the paper.

2. The Village and the Need for a New Bridge

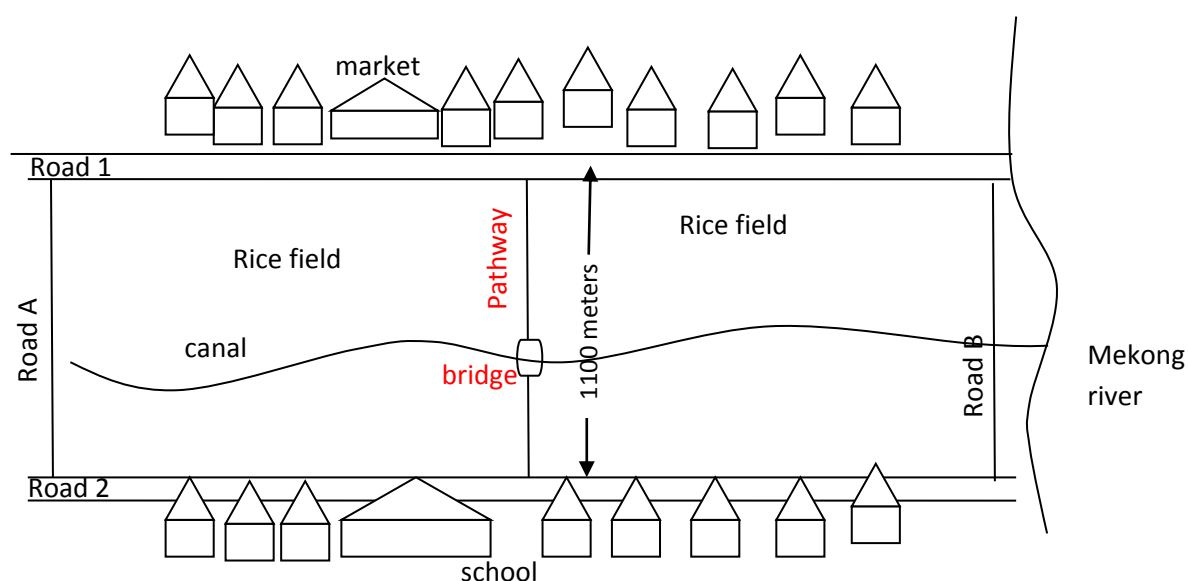
The field experiment was undertaken in Giong Trom village in the Mekong River Delta in Vietnam in 2009.² Most households in the village are engaged in rice cultivating activities. The village suffers one of the problems typical of the Mekong River Delta: the lack of a basic infrastructure such as rural roads, bridges, and irrigation canals. The government only provides larger public goods such as roads between villages, while small-scale infrastructure within a village is considered to be the responsibility of the village.

The field experiment concerns funding of a bridge for the village. At the time of the experiment, there was a wooden bridge about two meters wide and 14 meters long. That bridge was actually built in 2005 based on voluntary contributions from households in the village. This means that the villagers were already before the experiment accustomed to the idea of financing a bridge based on voluntary contributions. However, since the contributions obtained in 2005 were not enough for a concrete bridge, a wooden one was built. People living along the two roads in the village used the pathway and the bridge to go through the

¹ However, it should be noted that the causality is not clear here, e.g. since the rules may in part reflect different donation attitudes among the countries.

² A village is a small commune or part of a commune and usually consists of 100-300 households.

rice fields (see Figure 1). Most villagers often used the bridge to go to the market, visit friends, or go to schools when the bridge was in good condition. However, over time the bridge has degraded, and was at the time of this study in a poor condition, e.g. implying that it could not be used by tractors or motorbikes; see the picture in Figure 1. When people do not use the bridge, they have to use alternative routes, either road A or road B, which are located parallel to and about 1,200 meters from the bridge's pathway; see the map in Figure 1. All 200 households, living on both sides of the bridge, would clearly benefit from a concrete bridge; all village households were also included in the experiment.



The wooden bridge

Figure 1: Map and picture of the field situation

In order to build a new bridge, a sufficient amount of money had to be collected from the villagers. This is where the experiment comes in: We devised a threshold public good game, in which villagers received an endowment from us and had the option to either keep the

money themselves or contribute some or everything to the funding of the bridge. The concrete bridge is a public good in the sense that regardless of whether the participants contribute to the public account, they would have the right to use the bridge free of charge. Table 1 reports background statistics of the households.

Table 1. Household characteristics

Variables	Definition	Mean	Std. dev.
Household size	Number of household members	3.84	1.61
Age	Household head age; in years	49.0	13.8
Male	= 1 if male household head	0.62	
Education	1 = No schooling (5%); 2 = Grade 1-5 (53%); 3 = Grade 6 – 9 (32%); 4 = Grade 10 – 12 (9%); 5 = Vocational school (1%) for household head	2.47	0.77
Monthly income	Monthly household monetary income in hundred thousand dong	18.13	12.78
Uses the bridge daily ³	= 1 if uses bridge every day	0.19	
Uses the bridge weekly	= 1 if uses bridge around 1 – 3 times a week	0.10	
Uses the bridge twice a month	= 1 if uses bridge around 2 times a month	0.17	
Uses the bridge once a month	= 1 if uses bridge around 1 time a month	0.30	
Cost of social events	Monthly expenditures for “social events,” e.g., weddings, and different kinds of ceremonies in hundred thousand dong	1.96	1.38
Member of the communist party	= 1 if at least one household member is a member of the communist party	0.10	
Association	= 1 if at least one household member is a member of a local association	0.49	
Punish	How likely is it that people who do not participate in community activities will be criticized or sanctioned? = 1 very unlikely ... = 5 very likely	2.41	1.51
Rice land	Total size of rice land currently being cultivated; in congs (1 cong = 1/10 hectare)	4.54	3.23
Saturday	= 1 if experiment was conducted on Saturday afternoon (first session)	0.57	0.49

³ The options for the question regarding the current use of the bridge were: 1 = Every day, 2 = Around two to three times a week, 3 = Around once a week, 4 = Around twice a month, 5 = Around once a month or less, 6 = Currently do not use the bridge at all. Since relatively few answered options 2 and 3, we merged them in the descriptive statistics and in the analysis.

The mean monthly income of about 1.8 million dong corresponds to about 95 USD, which is less than one USD per household member and day. The average household in the study is thus poor and the average education level is low. The average size of the land a family is currently cultivating rice on is also rather small, approximately half of a hectare. Although the current bridge is degraded, it is still used by almost half of the households at least twice a month, and almost 20% use it every day.⁴ The large average amount spent on social events, around 200 thousand dong per month or 13% of the total monthly household expenditure, reflects the importance of such events, including weddings and funerals. This cost may perhaps also reflect the social coherence of the family with the community. Around 10% of subjects are members of the communist party and approximately half of the families are members of at least one local association such as the Farmers', Women's or Veteran's Associations or the Youth Union. These variables are included in our analysis in order to test for possible associated social capital effects of belonging to these organizations on voluntary contributions. The variable Punish is included in order to test whether people's subjective perceptions of the strength of the social norms regarding free-riding affect actual contributions. This was assessed with the question "How likely is it that people who do not participate in community activities will be criticized or sanctioned?"

Based on *t*-tests, proportion tests, and chi-square tests, we cannot reject the hypothesis of equal distributions of household characteristics among the five different treatments, with one important exception: Although the five treatments (defined below) were randomly assigned to the households, the share of subjects who used the bridge often is significantly (and substantially) higher in treatment 3 than in all other treatments. Since this turns out to be an important explanatory variable for actual contributions, it will of course have implications for how to best analyze our data.

⁴ In the analysis, we will assume that the current use of the bridge is a good indicator of the use of the new bridge. For most households, this is most likely a reasonable assumption.

3. The Threshold Public Goods Game with a Refund Policy and Proportional Rebate Rule

The experiment is based on a threshold public goods game⁵ (Isaac et al., 1989; Bagnoli and McKee, 1991; Cadsby and Maynes, 1999; Croson and Marks, 2000; Rondeau et al., 2005) with a refund policy and proportional rebate rule framework (e.g., Marks and Croson, 1998). In such a game, an identical endowment E is provided to each of N subjects; in our case $E = 400,000$ dong and $N = 200$. Each subject i decides privately how much x_i of the endowment to contribute to the public good. When the total contribution is larger than the threshold T , the public good will be provided; in our case, the bridge would be built if the total contributions would exceed 40,000,000 dong, corresponding to an average contribution of 200,000 dong. In this case, subject i 's net payoff would equal the sum of the net private consumption after contributing x_i , which hence equals $E - x_i$, the own benefit from the public good G_i , and a share of the excess contributions in proportion to the magnitude of the own contribution relative to the total contributions. Individual i 's payoff function π_i is then given by the first line on the right-hand side below:

$$\pi_i = \begin{cases} E - x_i + G_i + \left(\sum_j^N x_j - T \right) \frac{x_i}{\sum_j^N x_j} & \text{if } \sum_j^N x_j > T \\ E & \text{if } \sum_j^N x_j < T \end{cases}$$

If, on the other hand, the total contributions fall below the threshold T , the public good will not be provided; in our case, the bridge would not be built. In this case, all contributions would be returned to the subjects, such that the payoff for each subject would simply equal the initial endowment E , as given by the second line on the right-hand side above.

It is clear that there are an infinite number of Nash equilibria in this game. In addition to the ones where no bridge is built and where each individual does not contribute anything, we have a continuum of Nash equilibria where the total contributions exactly equal the threshold

⁵ This framework relates closely to the lump-sum matching setting discussed in several papers (e.g., Baker II et al., 2009), where total contributions often are greater than with a standard voluntary contribution mechanism. However, if, in the matching setting, the contributions to the public goods do not meet the minimum requirement, those contributions still generate earnings for the subjects. In this threshold public good game setting, if the threshold cannot be reached, the refund policy is applied.

level. Note that this is of course true regardless of whether the actual distribution of contributions is symmetric; for further details see Palfrey and Rosenthal (1984) and Bagnoli and Lipman (1989).

However, in our case we have that N is rather large (200),⁶ implying that the probability that the individual contribution decision will be decisive for whether the bridge will be built or not is small. It is easy to show that the condition for when an individual's choice has the potential of being decisive is that $\frac{N-2}{N-1} < \frac{x_{-i}}{T/N} < \frac{N}{N-1}$, where x_{-i} is the average of the others' contribution. In our case, where $N = 200$ and $T = 40,000,000$ dong, an individual can affect the decision of whether to build the bridge when $198,995 < x_{-i} < 201,005$, where x_{-i} denotes the average contribution when disregarding i 's contribution. This is clearly a narrow range. When x_{-i} is sufficiently low, i.e., smaller than 198,995 dong, the individual contribution does not matter at all, since the individual will receive E regardless of his/her own contribution. When x_{-i} is sufficiently large, i.e., larger than 201,005 dong, the bridge will be built regardless of how much the individual contributes. Moreover, in this case the unique best response of the individual is to contribute nothing, i.e., to free-ride. Given this narrow range where the individual contribution matters for the decision of whether to build the bridge, and given the large range where the unique optimal response, based on conventional self-interested preferences, is to contribute nothing, we believe it is reasonable to interpret the individual contribution as a measure of the strength of social preferences, or cooperative behavior. Yet, one could argue that the unique symmetric efficient equilibrium where each household contributes 200,000 dong could serve as a focal point for the subject due to cognitive reasons (cf. Schelling, 1960) or in order to maintain a self-image as fair-minded (cf. Andreoni and Bernheim, 2009). We will return to this issue in the results section.

4. Experimental Design

Our experimental design includes two stages. The first stage consisted of the field experiment with the 200 households in Giong Trom village in Vietnam, while in the second stage, conducted four weeks after the experiment, a team of experimenters visited the same

⁶ In our case, it is realistic to assume that the group size is known and certain for the subjects since it was stated explicitly in the contribution agreement signed by the subjects, and they are well aware that all households in the village use the bridge; see de Kwaadsteniet et al. (2008) for discussions on uncertain group size impacts on cooperation.

households to collect socio-economic data and other information that can help explain the experimental results.

4.1 Making the Public Good Familiar

The field experiment was conducted in collaboration with a local NGO, both for practical reasons and for making the whole situation more “real” and less academically artificial. In order for the decision to be as close to a real decision situation as possible, it is also important that the subjects are reasonably well informed about the possibilities of providing the actual public good, and that they have reflected about such possibilities beforehand. Therefore, we felt it was necessary to provide some information about the possibility of building a bridge before the actual experiment took place. Specifically, we asked local officials to ask villagers about alternatives for the bridge, and whether they wanted a new bridge. One week before the experiment we held a meeting with local officials and some representative households, where we went into more details about funding options for the establishment of the bridge. One of the options mentioned at the meeting was the possibility of a matching fund mechanism, in which villagers would contribute some proportion of the bridge costs and external donors would contribute the rest. At the meeting, we also discussed that a project team would visit households in the village in the next few weeks to ask about the “demand for the bridge” for the donors to decide whether or not a bridge should be built. Thus, the targeted group was given the possibility to absorb the information about a potential new bridge systematically over a relatively long time, such that they were not surprised when someone approached their home asking about contribution to the bridge.

However, they did not know the details regarding funding and their own role until this information was given to them as part of the experiment instructions. Furthermore, it was in no way decided that the bridge would be built. The information was not detailed enough to enable the households to agree on a response before the experiment. These pre-experimental tasks also helped us achieve a 100% participation rate and assure credibility of the experiment. It should also be noted that local public goods are funded in a similar fashion from time to time in the area, and that the old bridge was actually funded by voluntary contributions of households in the village.

4.2 Experimenter Recruitment and Training

The set-up of the experiment (discussed further below) required the 15 experimenters to each make 13 to 14 visits. Each visit took on average 20 minutes. Due to the challenge of experimenter bias, we took great care in the process of recruitment and training. The experimenters were recruited via advertisements at the University of Economics in Ho Chi Minh City. We selected only those who met our requirements regarding personality and ability to talk with farmers, e.g., those with the appropriate dialect. The selected persons went through extensive training in the classroom and in the field. They spent nearly one week practicing the experiment in role-play pairs and for pilot interviews with farmers. Moreover, before the experiment, the experimenters had spent more than one month in a similar rural area in connection with another survey, so they understood well what to do and what not to do when visiting a household. We also prepared a list of questions and answers related to the project, and to the establishment of the bridge in particular, so that the experimenters would have similar answers to common questions. During the training and practice sessions, the experimenters were repeatedly told about the importance of using the exact prescribed wording of the experiment scenarios. They were also required to repeat the scenario until the subject understood it without any further explanation.

4.3 The Experiment Conducted at the Subjects' Home

With the help of local officials, we were able to set up a list of household subjects, representing each of the 200 households. We then randomly allocated these to our 15 experimenters. To make the subjects feel as accustomed as possible to the situation, we did not conduct the experiment in a common venue where participants came to make decisions, as seen in standard public good games. Instead, the subjects made contribution decisions in their own homes. This approach created an environment similar to other investment decisions that the families make in daily life and helped limit communication in our group of 200 subjects. Another advantage of this was that it facilitated, in most cases, joint family decisions⁷ rather than decisions made by a single family-representative.

⁷ One story told by an experimenter was that after listening to the context and reading the agreement, a husband told us that his family would like to contribute 300,000 dong to the bridge. Then the experimenter saw the wife kick her husband's leg under the table, and finally they decided to contribute 100,000 dong.

Several considerations were made when deciding the size of the endowment and the threshold. The endowment couldn't be higher than the cost of building the bridge. Furthermore, a too high endowment could make subjects feel coerced to contribute some money and a too low endowment could seem unrealistic to the subjects, making us unable to observe sufficient variation in contribution levels.

In the experiment, the experimenter initially introduced himself or herself as a member of the bridge project team who would like to know the demand for the bridge in order to make a final decision on the construction of the bridge. The experimenter proceeded by reading the experimental instructions and showing the subject the example cards (see Appendix 2). The threshold was explained with the following sentences.

“The concrete bridge will be established if all families together contribute at least 40 million dong. This means that if the total contribution is equal to or above 40 million dong, the project will use this money, add more funding in order to meet the costs of the bridge, and take the responsibility to build the bridge. If the total amount of money collected exceeds 40 million dong, the excess amount will be returned to your family according to the proportion you contributed.

If the families are unable to contribute a total of 40 million dong, your contribution will be returned to you, and the concrete bridge will not be built.”

The actual cost of building the bridge was around 80 million dong, but we did not have an exact cost estimate at the time of the experiment. Therefore the amount of matching funds was not stated explicitly. Instead the subjects were simply informed that more funds would be added to cover the total costs of building the bridge. Moreover, although there is always a non-negligible degree of uncertainty regarding the actual cost in a decision such as the present one, the supporting money meant that we could specify exact conditions for when the bridge would and would not be built.

After this part, the experimenter presented the agreement. The agreement stated that the endowment of 400,000 dong would belong to the household. It also summarized the rules of the contribution framework⁸ as well as stated a date of payment, and had spaces for the signatures of the household and project representatives. Once the household had decided about its contribution, the amount was written on two photocopies of the agreement, which

⁸ In the agreement, it was made clear that the project and not the local government would be responsible for building the new bridge if the threshold could be reached. This helped avoid possible problems with distrust in the government.

were then signed by the household representative. Each party kept one copy of the agreement. We could not pay them the cash directly, since the payment depended on the behavior of others.

Conducting the experiment at the individual households' homes presented two major challenges. First, we faced the risk that the information could spread among village members before all subjects had made their decisions. Such a spread of information could take place mainly through two channels: villager-to-villager and local officials-to-villagers. We were more concerned about the latter channel since local officials naturally wanted the bridge and could choose to visit the villagers and pressure them to contribute at least the level of the symmetric threshold efficient equilibrium, i.e., 200,000 dong. In order to reduce the risk of information spread, we had to use a larger number of experimenters than in a standard experiment. After balancing several factors such as number of experimenters, time requirement for a decision, and risk of information spread, we decided to conduct the experiment on a Saturday afternoon and on the following Sunday morning using 15 experimenters. Another purpose of choosing Saturday and Sunday was to limit the observation or intervention of other local government officials since they were off work. Using 15 experimenters meant that we could conduct the experiment at 15 households at time. The experiments were conducted in such a way that each household's closest neighbors conducted the experiment at the same time, in order to reduce the risk of information spread. Finally, we used the fact that the bridge was severely degraded and conducted the experiment on one side of the bridge on Saturday and on the other side on Sunday.

4.4 The Five Experimental Treatments

The field experiment involved five treatments, which were randomly distributed among the 15 experimenters: (1) a standard treatment with no reference contribution level and no default option, (2) a treatment with a high reference contribution level (300,000 dong) and no default option, (3) a treatment with a low reference contribution level (100,000 dong) and no default option, (4) a treatment with no reference contribution level and a default option at zero contribution and (5) a treatment with no reference contribution level and a default option at full contribution of the endowment. In all treatments, the contributions were anonymous to

everybody except the experimenter. For ethical and practical reasons, the endowment of 400,000 dong was, following standard practice, a windfall gain for the subjects.⁹

Following Alpizar et al. (2008), the treatments with different reference contribution levels were conducted by providing the subjects with information about a typical previous contribution of others. The typical contribution levels were obtained from the first no reference contribution treatment during the first day, i.e., from the treatment where we did not tell the subjects anything regarding others' contributions. Subjects were told that "we have interviewed other households in this village and one of the most common contributions has been 300,000 [100,000] dong." This statement reveals information about the typical behavior and not about any individual contributions. Thus, this conveys more information about the social norm than just stating the contribution of one other person.

The default option treatments were conducted using a metal card with different contribution levels. Zero dong was at the bottom of the metal card, 400,000 dong was at the top of the card, and there were in total 9 amounts on the metal card. A magnetic token was put at the 0 dong level or at the 400,000 dong level. Subjects in the corresponding treatments were asked to move the token to the amount that they wanted to contribute to the public good. There are several potential reasons why the default alternative could affect the subjects' choices. First, they might interpret the default alternative as indicative of the experimenter's expectations, in our case the expectations of the project. Second, they could interpret it as information about what others do. Third, it could serve as a simple anchoring effect.

4.5 The Household Survey

Four weeks after the experiment, all the households were visited by a group of enumerators (not the same ones as we used in the experiment). The enumerators said that they came from the university to collect data for research purposes. This survey was part of a larger research project concerning villagers' adaptation to climate change. The part of the questionnaire that

⁹ The empirical evidence on windfall gains in public good games is not clear. Cherry et al. (2005) and Clark (2002) find no evidence of a windfall-gain effect on contributions, while Kroll et al. (2007) find significant differences in a public good experiment with heterogeneous endowment. Yet, while it is certainly possible that windfall gains affect behavior in a non-negligible way, our main interest is in the comparison between treatments and not in the absolute values, and we have no particular reason to believe that windfall gains would affect behavior differently among the treatments.

relates to this project includes a socio-economic demography section (e.g., income, assets, age, education etc.) and a section on social capital (e.g., association social capital indexes, trust questions etc.). There were also two crucial questions regarding the household's current use of the bridge. The purpose of these questions was to find out how much the different households use the bridge.

5. Results

5.1. Descriptive results

In total, 200 households (i.e. all households in the village) participated in the experiment. The overall average contribution was substantial, 270,000 dong, and a large majority (78%) of the subjects contributed the threshold level or more. These are very large contribution levels compared to most contribution levels observed in threshold public good games; see Croson and Marks (2000) for a review. The levels are particularly striking as there is evidence that thresholds, if anything, tend to reduce contributions (Rondeau and List, 2008; Rauchdobler et al., 2010). Yet the results are consistent with previous findings on contribution levels among poor Vietnamese households; Carpenter et al. (2004 a, b) found average contribution levels of around 70% of the endowment in a public good game conducted with poor Vietnamese households. Moreover, Cardenas and Carpenter (2008) found large cooperation rates more generally in various kinds of field experiments conducted in developing countries. It is also possible that the procedure with the experiments conducted at the subjects' homes amplified contribution levels, e.g. through less anonymity in relation to the enumerators and effects through communication (cf. Andreoni and Rao, 2011). The fact that parts of the cost of constructing the bridge were funded by the NGO and not the villagers, and that this was known by the subject, could also have increased contributions. Note that the contribution by an outsider in the present experiment is not exactly the same as either the use of seed money (Andreoni, 1998) or matching funds (Karlan and List, 2007), but still fairly similar. The existing empirical evidence from charity field experiments on the effect of seed money and matching funds are, however, mixed. For example, List and Lucking-Reiley (2002) found substantial and significant effects on contributions of seed money and Karlan and List (2007) found overall a substantial positive effect of matching contributions, but only on some groups of potential donors, whereas Huck and Rasul (2011) and Karlan, List and Shafir (2011) found much weaker evidence of positive effects of matching contributions.. Finally, the refund

policy could also contribute to explain the high levels of contributions since the subjects knew that they would receive the money in return of the bridge was not built or if more than the required amount of money were collected (Bagnoli and Lipman, 1989; List and Lucking-Reiley, 2002). Yet it should be emphasized that our main interest in the present paper is not to not anylize the contribution levels per se, but to compare contribution differences among treatments.

As discussed in Section 3, the threshold public good game has a unique symmetric efficient equilibrium (yet, recall that there are an infinite number of non-symmetric efficient equilibria), where each household believe that all other households would contribute 200,000 dong, and thus they also would contribute 200,000 dong. However, although a contribution of 200,000 dong is common in all treatments, it is not even the most common one, and there are never more than 30% of the subjects that contribute exactly 200,000 dong.

It is also likely that many of the households would greatly benefit from building the bridge, even though each household would of course financially benefit even more from free-riding. In all five treatments, the average contribution is above the threshold of 200,000 dong. Consequently, the bridge was actually built; see Figure 2 for a picture of the new bridge. The Appendix 1 presents the basic results of the experiment. However, since, as mentioned, the randomization procedure unfortunately did not result in similar distributions among the sub-samples with respect to a key explanatory variable, the use of the bridge, we will focus our analysis on the results from a regression analysis.



Figure 2. The new bridge

5.2 Econometric Analysis

Since there are, as mentioned, some rather substantial differences between the samples in terms of their use of the bridge, it is important to control for the effect of the socio-economic characteristics. The first model we estimated is a standard OLS model where the dependent variable is the level of contribution; we also estimated a Tobit model with censoring at zero and 400,000, and the results are very similar to the ones of the OLS model.¹⁰ We also estimate two probit models: In the first model, the dependent variable is equal to one if the contribution was 100,000 or less, whereas in the second model the dependent variable is equal to one if the contribution was 300,000 or more. Thus, these probit regressions reflect the determinants of contributing a small or a large amount, respectively. For each case we estimate three models. In the first we only include treatment dummy variables and the bridge use variables. In the second we also include socio-economic characteristics and enumerator dummy variables. In the third we also include a few variables that could be correlated with the socio-economic characteristics: *i*) the variable measuring whether they think it is likely that people who do not participate in community activities are punished, *ii*) number of associations they are a member of, and *iii*) the cost of social events. The results are presented in Table 2. In all models, we include dummy variables for the experimenters.¹¹ As can be seen, the size and significance of the treatment dummy variables are not sensitive to model specification; we therefore focus our discussion on model 1 for each case.

The regression results show that when controlling for the use of the bridge, there is a significantly lower average contribution in the treatment with a low reference contribution than in the treatment without any reference information. At the bottom of the table, we also report F-tests of the hypothesis of equal treatment coefficients, and this reveals that there is a significantly lower average contribution in the treatment with a low reference contribution than in the treatment with a high reference contribution. On average, subjects contributed 60,500 dong less – from an endowment of 400,000 dong – in the low-reference contribution treatment than in the treatment without any reference information (in the first regression model). However, there is no significant difference between the standard treatment and the high-reference contribution treatment. Note also that if the respondents were to act

¹⁰ These results are available from the authors upon request.

¹¹ It could be argued that the variable measuring whether they think it is likely that people who do not participate in community activities are punished is correlated with socio-economic characteristics. However, we have estimated all models without this variable and the results are robust.

strategically based on pure self interest, we would if anything be observing that people contributed less if they believed that others were going to contribute more. Consequently, to the extent that such a strategic effect exists, the measured effects of social influence are underestimated. If people are informed that one of the most common contributions by others is 100,000 dong, they tend to contribute around 60,500 dong less themselves, whereas if they are told that one of the most common contributions by others is 300,000 dong there is no difference compared to not saying anything about others' contribution. Given that the overall average contribution in the experiment (270,900 dong) is not very far from 300,000 dong, this result is not surprising.

Similarly, the two probit models reveal that it is more likely (around 24 percentage points more likely) that subjects give 100,000 dong or less and less likely (around 20 percentage points less likely) that they give 300,000 dong or more when they are told that a common contribution is 100,000 dong; both of these effects are significant. However, just as in the OLS model on the level of contribution, there are no significant effects of the high reference contribution treatment.

Table 2 OLS regressions on contribution and probit models on low and high contributions; reference contribution and default treatments

	OLS: Contribution in thousand dong			Probit:= 1 if contribution ≤ 100,000			Probit: = 1 if contribution ≥ 300,000		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
High reference contribution	-4.428 (27.193)	-15.446 (27.998)	-10.816 (26.630)	-0.034 (0.085)	0.002 (0.087)	0.002 (0.087)	0.038 (0.116)	-0.009 (0.124)	0.025 (0.127)
Low reference contribution	-60.475** (27.520)	-65.935** (28.580)	-81.882*** (27.436)	0.238** (0.118)	0.280*** (0.131)	0.318** (0.139)	-0.209* (0.115)	-0.237* (0.122)	-0.291** (0.122)
Default at full contribution	-2.355 (26.847)	-18.760 (27.841)	-27.104 (26.714)	0.032 (0.094)	0.024 (0.091)	0.032 (0.097)	0.031 (0.116)	-0.045 (0.125)	-0.072 (0.133)
Default at zero contribution	-50.593* (27.479)	-54.220* (28.566)	-61.460** (27.222)	0.119 (0.107)	0.125 (0.111)	0.142 (0.117)	-0.176 (0.115)	-0.198* (0.121)	-0.218* (0.125)
Use the bridge daily	120.336*** (26.298)	120.227*** (27.883)	107.575*** (26.727)	-0.179*** (0.046)	-0.161*** (0.041)	-0.148*** (0.042)	0.455*** (0.075)	0.489*** (0.078)	0.481*** (0.083)
Use the bridge weekly	91.395*** (32.672)	84.446** (35.608)	78.227** (34.220)	-0.151*** (0.052)	-0.090 (0.067)	-0.078 (0.074)	0.377*** (0.090)	0.399*** (0.097)	0.392*** (0.103)
Use the bridge twice a month	71.021*** (27.165)	64.407** (28.278)	57.018** (26.966)	-0.136*** (0.053)	-0.117*** (0.047)	-0.103** (0.051)	0.304*** (0.096)	0.299*** (0.106)	0.305*** (0.108)
Use the bridge once a month	28.638 (23.268)	32.322 (24.937)	31.401 (23.739)	0.064 (0.071)	0.096 (0.076)	0.101 (0.078)	0.180* (0.096)	0.229* (0.105)	0.251** (0.110)
Household size		4.890 (5.906)	1.642 (5.708)		-0.010 (0.016)	-0.003 (0.017)		0.024 (0.026)	0.008 (0.028)
Age		0.252 (0.737)	0.106 (0.726)		-0.002 (0.002)	-0.002 (0.002)		0.002 (0.003)	0.002 (0.004)
Male		-8.525 (18.859)	-14.369 (18.060)		0.012 (0.052)	0.017 (0.052)		-0.051 (0.085)	-0.071 (0.089)
Education		16.421 (13.882)	11.416 (13.293)		-0.039 (0.042)	-0.028 (0.042)		0.094 (0.067)	0.094 (0.072)
Income		0.842 (0.782)	0.744 (0.790)		-0.003 (0.002)	-0.002 (0.002)		0.004 (0.004)	0.004 (0.004)
Rice land		1.041 (3.082)	-0.121 (2.949)		-0.017* (0.010)	-0.016* (0.010)		0.001 (0.014)	-0.006 (0.015)
Communist party member		35.943 (31.554)	22.893 (30.59)		-0.008 (0.103)	0.003 (0.114)		0.156 (0.136)	0.103 (0.152)
Saturday		-17.682 (19.006)	-22.752 (18.318)		-0.026 (0.054)	-0.008 (0.055)		-0.151* (0.136)	-0.184** (0.088)
Association			9.433			0.012			0.047

Social events			(18.924)			(0.056)			(0.93)
			20.702***			-0.033			0.091***
			(7.063)			(0.024)			(0.035)
Punish			23.140***			-0.036**			0.102***
			(5.950)			(0.018)			(0.031)
Constant	242.505***	108.991***	191.669	-0.889***	1.358	0.549	-0.423*	-2.205***	-1.646*
	(23.293)	(72.436)	(72.623)	(0.289)	(1.002)	(1.105)	(0.255)	(0.867)	(0.963)
	F-test	F-test	F-test	F-test	F-test	F-test	F-test	F-test	F-test
	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)
H ₀ : High reference = low	4.12	3.10	6.59	6.59	5.86	6.82	4.22	3.10	5.48
reference contribution	(0.043)	(0.080)	(0.011)	(0.010)	(0.016)	(0.010)	(0.040)	(0.078)	(0.019)
H ₀ : Default at full =	3.12	1.54	1.58	0.80	0.98	1.08	3.07	1.46	1.24
default at zero	(0.080)	(0.216)	(0.210)	(0.372)	(0.321)	(0.299)	(0.080)	(0.227)	(0.266)
Experimenter dummy var.	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
No. of obs.	200	200	200	200	200	200	200	200	200
Adj. R2 / Pseudo R2	0.105	0.097	0.184	0.120	0.221	0.249	0.111	0.194	0.252

*, **, and *** denote that the coefficient is statistically significant at the 10%, 5%, and 1% levels, respectively.

For the default treatments, we find that the zero-contribution default has a larger effect than the full-contribution default. Yet, similar to the reasoning above regarding the effect of reference contribution levels, this need not mean that a full-contribution default does not have an effect in general, since in our experiment the contribution levels are on average very high. A zero-contribution default, compared to no default, reduces the contribution by about 51,000 dong, which is a substantial amount corresponding to about 20% of the average contribution. A comparison of the full-contribution and zero-contribution defaults reveals that the difference in contributions is only significant in the second model. Moreover, the probit regressions reveal that it is less likely (around 20-29 percentage points less) that subjects give 300,000 dong or more with the zero-contribution default than with no default contribution. There is however no significant effect on the likelihood of giving 100,000 dong or less.

Among the household characteristics, how much the household used the bridge is an important determinant of the amount of money contributed to the bridge. Households that used the bridge every day contributed, on average, around 120,000 dong more than households that did not use the bridge (the reference category) in the first regression model. There are no significant effects of age, gender of household head, level of education, size of land, or household income on contribution. Among the variables intended to measure social capital, only the effect of social events is significant, with households with high monthly expenditures for social events contributed significantly more than other families. Our conjecture is that households with a large network in terms of many relatives and many friends, has a higher cost of social events. One interpretation of this is that these households have a larger number of households in the village that they care about, and that they think would benefit from the construction of the bridge. The punishment variable has a significant effect on contribution behavior. Finally, subjects who thought they would be more likely to be punished if they did not contribute to local public goods (in general) gave significantly more to the public good in our experiment, which follows intuition. Those who consider it very likely (coded as 5) “that people who do not participate in community activities will be criticized or sanctioned” contribute almost 100,000 dong more than households who consider this very unlikely (coded as 1).

6. Conclusions

In this paper we analyze a field experiment with real contributions to an archetypical public good, a bridge, in rural Vietnam. In particular, we study the role of two types of social influence: *i*) conditional cooperation, i.e., that people may be more willing to cooperate if others do and *ii*) the effects of the default alternative, i.e. that people are often found to be influenced by the default alternative presented to them in the choice situation. Numerous studies have analyzed the role of conditional cooperation in laboratory experiments (see, e.g., Fischbacher, 2001; Fischbacher and Gächter, 2010) and for charitable giving (see, e.g., Alpizar et al., 2008; Shang and Croson, 2009) as well as the effects of defaults for the choice of private goods (see, e.g., DellaVigna and Malmeinder, 2006). Yet, as far as we know, no previous studies have tried to quantify the treatment effects of conditional cooperation and default alternatives on the voluntary contributions of a real local public good, and hence not for such a public good in a developing country. We find significant and substantial effects of provision of reference information about what others are doing as well as of default alternatives, which is in line with previous findings in laboratory experiments and for charitable giving. For example, if people were informed that one of the most common contributions made by others was 100,000 dong (a relatively low contribution), they tended to contribute around 60,500 dong (or about 25%) less compared to when not saying anything about others' contribution. Similarly, a zero default contribution, compared to a treatment with no default contribution, reduced the contribution by about 51,000 dong, which is a substantial amount corresponding to almost 20% of the average contribution.

These findings are important as they contribute to our general understanding of the determinants of contributions to a real public good in general, and in developing countries in particular. This is important since there is much evidence that the ability to provide an adequate amount of public goods is crucial for economic and social development. The results are also potentially important from a more direct policy perspective at different levels. In Vietnam, many local public goods are funded by the villages themselves. Our experiment suggests that a matching fund voluntary contribution mechanism could be a useful instrument. Moreover, our results reveal that the behavior and contribution of subjects depend on the framing of the questions asked. Yet, from the perspective of the 200 households in the Giong Trom village in Vietnam, the most important result of this study is clearly that they now have a new and well-functioning concrete bridge in place.

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Appendix 1.

Table A1. Descriptive results of the field experiments

Treatment	Obs.	Mean contribution in 1,000 dong (std. dev.)	Share of contributions				
			= 0	= 100	= 200	= 300	= 400
Reference treatment	40	287.5 (199.7)	0.000	0.125	0.275	0.075	0.475
Low reference contribution	41	247.6 (132.3)	0.025	0.244	0.268	0.073	0.366
High reference contribution	39	284.6 (108.9)	0.000	0.128	0.282	0.205	0.385
Default at zero	38	245.3 (130.4)	0.000	0.132	0.263	0.079	0.342
Default at full	42	288.1 (141.3)	0.071	0.119	0.167	0.024	0.500

Table A2. Distribution of contributions for each treatment

Contribution	Reference	High reference contribution	Low reference contribution	Default zero contribution	Default full contribution
0	0	0	1	0	3
20	0	0	0	1	0
50	1	0	1	3	0
100	5	5	10	5	5
150	0	0	0	2	2
200	11	11	11	10	7
250	1	0	0	1	0
300	3	8	3	3	1
400	19	15	15	13	24
Total	40	39	41	38	42

Appendix 2. Experimental instructions

Hello,

As you may be aware, the Environmental Economics Unit of the Ho Chi Minh City University of Economics is considering several alternatives in constructing a concrete bridge in this village. My name is..... I am a representative of this organization and would like to ask you about your opinions on the construction of the bridge.

You and your neighbors will decide whether to build the concrete bridge or not. We are giving money to households and letting them decide how to use it. We are asking households to contribute from this money to fund the bridge construction. We will respect the choice of every villager. We won't evaluate whether your choice is right or wrong.

Now I would like to briefly introduce the bridge project. A new concrete bridge is being considered to be built to replace the degraded Cầu Kinh Giữa. The new bridge would be a concrete bridge that will last about 20 years. The bridge would be 2 meters wide so even tractors can use the bridge. The bridge is a common asset, so everyone who is living in or out of the commune has the right to use it without paying any fee.

Now we would like to know your opinion about the possible construction of the concrete bridge. We are also talking with all other households in your village. The project will give 400,000 dong to each family in this neighborhood, which includes 200 families. Here is the agreement saying that 400,000 dong belongs to your family.

Note that you are in the group of 200 families living in this neighborhood and only these families are financially supported by the project. And now your family, together with other 199 families, has to decide whether the bridge should be built or not. Here is the information you need to consider to make your decision:

- Each family has 400,000 dong provided by the project.
- We would like to ask how your family would want to use this money. You can choose any amount to allocate to the construction of the bridge, from 0 dong to 400,000 dong.
- The concrete bridge will be established if all families together contribute at least 40 million dong. This means that if the total contribution is equal to or above 40 million dong, the project will use this money, add more funding in order to meet the costs of the bridge, and take the responsibility to build the bridge. If the total amount of money collected exceeds 40 million dong, the excess amount will be returned to your family according to the proportion you contributed.
- If the families are unable to contribute a total of 40 million dong, your contribution will be returned to you, and the concrete bridge will not be built.”
- Your family is under absolutely no obligation to contribute any money to the concrete bridge, as the money is yours. Even if your family is not willing to contribute or is

willing to contribute only a small amount, if the bridge goes into operation you will have the full right to use the bridge since the bridge is common property.

- No one in the commune, not even the officials, will know about your decision. We will keep your contribution information secret.

If the households are able to contribute 40 million dong in total, our project in cooperation with the Farmers' Association will start the construction in the next few months.

I will give you several examples of the decision rule. Please look at the poster here.

[Example posters]

Example 1:

Suppose your family contributes 100,000 dong to the concrete bridge. Also suppose that there is a total of 30 million dong contributed to the concrete bridge. Because the community did not meet the 40 million dong requirement, the concrete bridge is not built. The 100 000 dong your family contributed to the concrete bridge is not lost; it is simply returned to you. You will have 400,000 dong.

Example 2:

Suppose your family contributes 200,000 dong to the concrete bridge. Assume the total contribution to the concrete bridge is 45 million dong. At this point, the concrete bridge will be built, regardless of who contributes what to the construction. The 5 million in excess of the contribution requirement will be returned to your family in proportion to your contribution. The return will be $(0.2/45) \times 5 \text{ million} = 22,000 \text{ dong}$. In total, your family will have $400,000 - 200,000 + 22,000 = 222,000$ in cash and the concrete bridge will be built.

Example 3:

Suppose your family contributes 100,000 dong to the concrete bridge. Assume the total contribution to the concrete bridge is 40 million dong. At this point, the concrete bridge will be built, regardless of who contributes what to the construction. In this case, your family will have $400,000 - 100,000 = 300,000$ dong in cash and the concrete bridge will be built.

I hope you clearly understand the way you can contribute to the concrete bridge. We will keep your contribution decision anonymous. This means that no one in the village, not even the people working with us in the Farmers' Association, will know about your contribution.

Treatment 1

Of the 400,000 dong you are provided and that becomes your own asset, how much is your family willing to contribute to construction of the concrete bridge?

_____dong.

Finally, we would like to ask you one more question. How much do you think other families will contribute on average? _____dong. Your guess will be kept anonymous. No one will know your estimation.

Treatment 2

We have interviewed other households in this village and one of the most common contributions has been 300,000 dong.

[Experimenter: stop here for 1 minute so that the subject can think about the meaning of this information. You should not need to explain further if there is no query]

Of the 400,000 dong you are provided and that becomes your own asset, how much is your family willing to contribute to construction of the concrete bridge?

_____dong.

Finally, we would like to ask you one more question. How much do you think other families will contribute on average? _____dong. Your guess will be kept anonymous. No one will know your estimation.

Treatment 3

We have interviewed other households in this village and one of the most common contributions has been 100,000 dong.

[Experimenter: stop here for 1 minute so that the responder can think about the meaning of this information. You should not need to explain further if there is no query]

Of the 400,000 dong you are provided and that becomes your own asset, how much is your family willing to contribute to construction of the concrete bridge?

_____dong.

Finally, we would like to ask you one more question. How much do you think other families will contribute on average? _____dong. Your guess will be kept anonymous. No one will know your estimation.

Treatment 4

[Experimenter: show the Card T4]

Of the 400,000 dong you are provided and that becomes your own asset, how much is your family willing to contribute to construction of the concrete bridge? Please move the token to the amount your family is willing to contribute.

_____dong.

Finally, we would like to ask you one more question. How much do you think other families will contribute on average? _____dong. Your guess will be kept anonymous. No one will know your estimation.

Treatment 5

[Experimenter: show the Card T5]

Of the 400,000 dong you are provided and that becomes your own asset, how much is your family willing to contribute to construction of the concrete bridge? Please move the token to the amount your family is willing to contribute.

_____dong.

Finally, we would like to ask you one more question. How much do you think other families will contribute on average? _____dong. Your guess will be kept anonymous. No one will know your estimation.